

Before the  
**FEDERAL COMMUNICATIONS COMMISSION**  
Washington, D.C. 20554

DOCKET FILE COPY ORIGINAL  
**RECEIVED**

DEC 19 1994

FEDERAL COMMUNICATIONS COMMISSION  
OFFICE OF SECRETARY

In the matter of )  
 )  
Allocation of Spectrum Below ) ET Docket No. 94-32  
5 GHz Transferred from Federal )  
Government Use )

**COMMENTS OF ANDREW CORPORATION**

Andrew Corporation, by its undersigned counsel, hereby submits these comments in response to the Notice of Proposed Rulemaking ("Notice") in the above-captioned proceeding released November 8, 1994. Andrew supports the reallocation of the 2402-2417 MHz band to nongovernment commercial applications but opposes the Commission's proposal to establish new high power commercial licensed services in that band. As discussed below, placing a new high power licensed service in the 2402-2417 MHz band will undermine the existing unlicensed Part 15 and Industrial, Scientific and Medical ("ISM") operations in that band.

**I. STATEMENT OF INTEREST**

Andrew Corporation, founded in 1937, is a well-recognized U.S. manufacturer of a wide variety of high-quality telecommunications equipment to over 6000 customers (both private and government) in the United States and in various foreign countries. Headquartered in Orland Park, Illinois, Andrew employs over 3,000 people in the manufacture of radio facilities used in the common carrier and private land mobile, microwave, broadcast and data services. In

No. of Copies rec'd \_\_\_\_\_  
List A B C D E \_\_\_\_\_

particular, Andrew is a major manufacturer of state-of-the-art mobile data equipment using spread spectrum modulation techniques.

## **II. THE COMMISSION'S REALLOCATION PROPOSAL**

In the Notice, the Commission proposes to reallocate 50 MHz of spectrum including the 2402-2417 MHz band<sup>1/</sup> from federal government to private sector commercial use. The Commission's stated public interest goals in this proceeding are to "provide for the introduction of new services and the enhancement of existing services . . . [in order to] create new jobs, foster economic growth and improve access to communications by industry and the American public."<sup>2/</sup> The Commission's Notice, as well as the Omnibus Budget Reconciliation Act of 1993 (in which Congress mandated the reallocation of 200 MHz) giving rise to this proceeding, both recognize that the public interest would benefit from identifying federal government spectrum that could be put to use for a greater public benefit in the private, commercial sector. Following the recommendations of the Department of Commerce's Preliminary Report and the comments submitted in a subsequent Notice of Inquiry,<sup>3/</sup> the Commission now proposes to adopt a broad and general allocation of the 2402-2417 MHz band, among other frequencies, that would permit licensees to offer a wide range of services employing varying technologies. The Notice proposes to allocate this spectrum generally for Fixed and Mobile services, rather than specify particular

---

<sup>1/</sup> The Notice also proposes to reallocate the 2390-2400 MHz and 4660-4685 MHz band. At this time, Andrew limits its comment to the 2402-2417 MHz band and takes no position on the proposed allocation of the 2390-2400 MHz and 4660-4685 MHz band.

<sup>2/</sup> Notice, at para. 1.

<sup>3/</sup> FCC Rcd. 2175 (1994).

services at this time. The Commission posits that this "flexible" approach would likely qualify for auctions and promote the development of innovative service features and technologies.<sup>4/</sup> Under the Commission's proposal, the reallocated spectrum would be divided in channel blocks of one to two megahertz available for exclusive licensed use within an area. Users of the reallocated spectrum would have flexibility to choose channelization, signal strength, modulation techniques, and antenna characteristics. Power limits at the service area boundaries would avoid harmful interference.

Notwithstanding the perceived public interest benefits of freeing up additional spectrum for new fixed and mobile private sector use, the Commission recognizes in the Notice that the targeted bands are already in use by a variety of nongovernment operations that may "make it difficult to implement" the proposed approach.<sup>5/</sup> Those incumbent private operations include unlicensed ISM devices and Part 15 devices operating in the 2402-2417 MHz band.<sup>6/</sup> These devices include unlicensed spread spectrum devices operating pursuant to Section 15.247 of the Commission's Rules.<sup>7/</sup> 47 C.F.R. § 15.247 (1993). Given the potential difficulties of establishing new licensed services in the 2402-2417 MHz band, the Commission seeks comment on whether it should retain or eliminate Part 15 use of that band, or limit licensed use of the

---

<sup>4/</sup> Notice, at para. 9.

<sup>5/</sup> Id. at 11.

<sup>6/</sup> Spread spectrum devices operate in the 2400-2483.5 MHz ISM band.

<sup>7/</sup> Section 15.247 permits spread spectrum devices to operate at power outputs somewhat higher than other unlicensed Part 15 devices. The spread spectrum technique substantially reduces the risk of interference. See Amendment of Parts 2 and 15 of the Rules with Regard to the Operation of Spread Spectrum Systems, 67 Rad. Reg. 2d (P&F) (1990) ("1990 Spread Spectrum Order").

band.<sup>8/</sup> With respect to the 2402-2417 MHz band, the Notice also seeks comment on permitting licensed services in the band that are subject to technical rules similar to Part 15 rules, or use of the band by the Mobile Satellite Service ("MSS"). Further, in order to avoid "excessive disruption of the amateur service,"<sup>9/</sup> the Commission proposes to maintain a secondary allocation or establishing a primary allocation in all or part of the spectrum (maintaining a secondary or eliminating the amateur services from other portions).

Andrew strongly supports Commission policies that promote full use of scarce spectrum resources and greater innovation in spectrum efficient radio technologies. In this instance, however, Andrew opposes the Commission's plan to the extent that it proposes to establish new, higher power licensed services in the 2402-2417 MHz band. Such new services would severely disrupt and impair existing unlicensed spread spectrum operations, including mobile data operations, and would not serve the public interest.

### **III. REALLOCATION OF THE 2402-2417 MHz BAND TO NEW HIGH POWER SERVICES WILL IMPAIR EXISTING SPREAD SPECTRUM SERVICES**

---

#### **A. Established FCC Policy Promotes Use of the 2.4 GHz Band for Unlicensed Devices**

---

As a leading provider of unlicensed spread spectrum mobile data equipment operating in the 2.4 GHz band, Andrew strongly believes that the reallocation of this band to commercial licensed services operating at relatively high powers will substantially impair unlicensed spread

---

<sup>8/</sup> Notice, at para. 18.

<sup>9/</sup> Notice, at para. 20.

spectrum devices currently operating in that band. Spread spectrum signals, by definition, spread signals over a large bandwidth. Under the Commission's Rules, the most common forms are direct sequence and frequency hopping systems that "hop" within a given bandwidth to avoid interference with other signals. The Commission has long recognized the inherent value of such spectrum efficient technologies and encouraged the use of spread spectrum systems in the 2402-2417 MHz band.<sup>10/</sup> In its First Report and Order in Gen. Docket No. 81-414, the Commission adopted rule changes with the express intent of taking advantage of the multiple benefits of spread spectrum technology, including:

- reduced interference to narrowband communications systems;
- significant improvements in communications, under conditions with poor signal to interference ratio;
- improved communications performance in selective fading and multipath environments; and
- multiple, nearly independent communications channels functioning simultaneously in the same spectrum.<sup>11/</sup>

More recently, in 1990, the Commission refined its spread spectrum rules to "increase the flexibility for design of Part 15 spread spectrum systems and thereby broaden their development and use."<sup>12/</sup> The Commission adopted rule changes to provide "maximum flexibility for the use of spread spectrum systems consistent with the basic precept of the Part 15 Rules that non-

---

<sup>10/</sup> The Commission's Rules expressly permit frequency hopping and direct sequence systems to operate in the 2400-2483.5 MHz band at power levels up to 1 Watt.

<sup>11/</sup> Amendment of Parts 2 and 97 of the Commission's Rules and Regulations to Authorize Spread Spectrum Techniques in the Amateur Radio Service, 58 Rad. Reg. 2nd (P&F) 328, 329 (1985).

<sup>12/</sup> Amendment of Parts 2 and 15 of the Commission's Rules with Regard to the Operation of Spread Spectrum, Notice of Proposed Rulemaking, 4 FCC Rcd. 6370 (1989).

licensed operations are not to cause harmful interference to established services."<sup>13/</sup> Among other uses, the Commission intended to encourage the development of wireless data terminals, remote meter reading, wireless local area networks, and personal communications networks.<sup>14/</sup> Therefore, the current proposal to reallocate a large segment of the 2400-2483.5 MHz band is inconsistent with the Commission's prior public interest findings and policies encouraging manufacturers and users to develop spread spectrum systems at these frequencies.

**B. Reallocation of the 2.4 GHz Band to Higher Power, Licensed Services Will Impose Significant Expense on Consumers and Manufacturers and Stifle Innovation In Spectrum Efficient Radio Technologies**

Pursuant to the Commission's Rules, many unlicensed Part 15 spread spectrum services are currently occupying the 2.4 GHz band. Business users and individual consumers, as well as the manufacturing industry that serves their demand, have invested substantial time and expense in the spread spectrum technologies that exist at 2.4 GHz. Manufacturers of spread spectrum equipment, such as Andrew, have long since completed the lengthy and expensive development process associated with generating new innovative spectrum efficient radio products.

Based on Andrew's technical and engineering expertise in this area, Andrew believes that there is little possibility that unlicensed Part 15 devices will be able to operate in the same band as licensed devices, particularly if those devices are allowed to use higher power levels. Licensed services subject to significantly higher power limits, will simply overpower lower power devices

---

<sup>13/</sup> 1990 Spread Spectrum Order, at 1546.

<sup>14/</sup> Id.

operating in the same band and will not themselves experience any significant interference. Low power devices, in contrast, will find the interference environment untenable and will be forced to halt operations at that spectrum location and search for another, more suitable spectrum home. Because equipment and technology have already been developed at the 2.4 GHz band -- with the express support of the Commission's Rules -- reallocation will impose additional development costs and render some systems wholly inoperable. Users who have recently purchased and installed systems operating in the 2.4 GHz band will be forced to purchase expensive modifications or, in some cases, abandon the equipment entirely. In exchange for expensive modifications, users will receive a reduced number of channels and/or significantly reduced throughput rates. In either case, the result of placing high power licensed services "on top" of the 2.4 GHz spread spectrum band will be to impair severely the many spread spectrum operations currently using that band.

**C. Recent Spectrum Allocation Changes Have Already Shrunk the Spectrum Available for Unlicensed Part 15 Operations**

Many manufacturers and users of unlicensed Part 15 equipment have recently suffered the expense and inconvenience of moving their equipment from the 902-928 MHz band to the 2.4 GHz band. As a practical matter, Part 15 manufacturers and users with systems operating in the MHz band are being forced to seek a new, more suitable "spectrum home" as a result of the Commission's proceeding in PR Docket 93-61, in which the Commission proposes to adopt permanent rules that will allow wideband multilateration systems in the Location Monitoring Service ("LMS") to operate in significant segments of the 902-928 MHz band. As the public comments in that proceeding demonstrate, under current Part 15 technical and

operational rules, unlicensed Part 15 devices will likely experience harmful interference from the presence of wide area, multilateration LMS systems operating in that band in the same geographic area. The Commission should recognize that its reallocation proposal for the 2402-2417 MHz band in this proceeding effectively "ousts" unlicensed Part 15 users from the very band that they moved to in order to accommodate an adverse reallocation in the 902-928 MHz band.

Based on Andrew's industry perspective, the Commission should also be aware that the mere proposal to authorize permanently high power licensed services in the 902-928 MHz band injected significant uncertainty in the Part 15 community and adversely affected sales. If the Commission now "chases" Part 15 operations from the 2.4 GHz band, Andrew believes that the Part 15 user community will lose confidence in this technology. Users will be extremely reluctant to invest in low power equipment that, based on repeated adverse reallocations in the past, will be rendered useless or materially impaired shortly after purchase.

#### **IV. ESTABLISHING NEW LICENSED SERVICES IN THE 2.4 GHZ BAND WILL HINDER U.S. SALES IN THE GLOBAL EQUIPMENT MARKET**

The 2.4 GHz band is also used on an international basis (2400 to 2500 MHz) for a variety of wireless applications. Pursuant to a new IEEE standard, U.S. manufacturers have developed equipment in this range for export. In the interest of promoting U.S. export sales and compatibility with international standards, the Commission should look to encourage unimpaired low power operations throughout the 2400 to 2500 MHz range, rather than reduce or limit such operations.



Andrew is developing equipment on this band for a multinational company for use in the United States and internationally as a part of Intelligent Transportation Systems ("ITS") or Intelligent Vehicle Highway Systems ("IVHS"). Andrew's engineers and developers are keenly aware that the current U.S. allocation is 17.5 MHz less than what is available internationally. To reduce the spectrum further will increase the disparity between the U.S. and other countries, making it even more difficult to develop a single system that can operate for both U.S. and international customers. As such, Andrew and other U.S. manufacturers will be subject to greater costs and inefficiencies than non-U.S. manufacturers whose technologies and products need not accommodate multiple interfering uses of the same band.

**V. THE PROPOSED 2.4 GHZ REALLOCATION TO NEW HIGH POWER, LICENSED SERVICES WILL NOT MEET THE COMMISSION'S PUBLIC INTEREST GOALS**

---

In the Notice, the Commission stated that the purpose of the allocation is to create new jobs, foster economic growth, improve access to communications by industry and the public. Andrew submits that these objectives may be served by devoting spectrum for licensed private sector operations in which no commercial operations currently exist. However, these objectives are not served by establishing new licensed services in spectrum that is already being devoted to private sector use. Dozens of new, high technology companies have been established in response to the Commission's Part 15 spread spectrum rules. Any adverse changes to the band structure will create additional development costs. In some cases, companies may not be able to adapt to the new rules. In that event, perversely, the Commission's reallocation proposal will result in the loss of jobs and a negative economic impact. Accordingly, Andrew submits that the current Part 15 use of the 2402-2417 MHz band already serves the Commission's (and the

Congress') stated public interest goals and the public interest would not be served by eliminating those benefits by establishing a new licensed service in the same band.

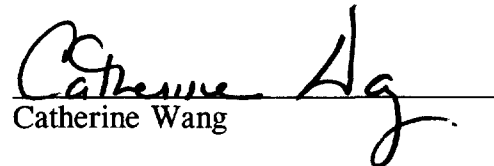
### **CONCLUSION**

For the reasons discussed above, Andrew Corporation respectfully urges the Commission not to establish new, higher power, licensed service that would impair Part 15 unlicensed operations in the 2402-2417 MHz band.

Respectfully submitted,

**ANDREW CORPORATION**

By:

  
Catherine Wang

SWIDLER & BERLIN,  
CHARTERED  
3000 K Street, N.W.  
Suite 300  
Washington, D.C. 20007  
(202) 424-7837

Dated: December 19, 1994